AMENDMENTS TO SPECIFICATION:

On pages 4-7 of the double spaced copy of the specification submitted with the original filing, kindly delete the present Summary of the Invention and substitute the following new Summary of the Invention:

Summary of the Invention

The invention is useful in a star network comprising a plurality of *N* nodes where N is an integer equal to or greater than three, the N nodes being intercoupled by a plurality of links, with one of the nodes being the hub node *h* and the other of the nodes being $\{x_1,\ldots,X_{N-1}\}$ spoke nodes coupled to the hub node by links each comprising a plurality of *W* channels going into the hub node h and out of the hub node h, where W is even. In such an environment, the nodes may be configured by a method including

(a) dividing the channels into two sets, with each set comprising W/2 channels, where the first set has channels numbered $\{0,\ldots,W/2-1\}$ and the second set has channels numbered $\{W/2,\ldots,W-1\}$; and

(b) configuring the hub node such that channel *i* on any one of the links may be coupled to channel *w(i)* on any of the links, where *w(i)* equals *i* + W/2 and where *i* is no greater than W.

The invention also is useful in a star network comprising *N* nodes where N is an integer equal to or greater than three, with one of the nodes a hub node, wherein each of the other of the nodes is coupled to the hub node by a multichannel link comprising *W* channels, where *W* is an even integer. In such an environment, the star network may be configured as follows: the hub node is configured such that channel *i* on any

one of the links may be coupled to channel *w(i)* on any other of the links, where *w(i)* = (i + W/2) and where *i* is no greater than *W*.

The invention also is useful in a network comprising *N* nodes and *E* links e_1, e_2, ...e_E, wherein *N* and *E* are any integer and wherein each link between nodes comprises a multichannel multiplexed link, comprising *W* channels {0, 1, ..., W – 1}, where *W* is even. In such an environment, a method of configuring the nodes in the network may comprise:

(a) grouping channels into two sets, $\{0,\ldots,W/2-1\}$ and $\{W/2,\ldots,W-1\}$; and

(b) at each node, for *i* = 0, 1, ..., W/2 – 1, coupling channel *i* on one link to channel *w(i)* on all the other links incident on that node, where *w(i)* = *i* + W/2.

The invention also is useful in a network comprising *N* nodes and *E* links for intercoupling the nodes where *N* and *E* are any integer, where each link comprises a multichannel multiplexed link comprising *W* channels, and where *W* is even. In such an environment, the network may be configured as follows:

each node, for *i* = 0, 1...., W/2 – 1, channel *i* on one incident link is coupled to channel *w(i)* on all other incident links of each node, where *w(i)* = i + W/2.

The invention also is useful in a star communication network comprising a hub node and a plurality of spoke nodes and comprising a plurality of links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry a plurality of W channels into the hub node and out of the hub node. In such an environment, a method of configuring the network may comprise the steps of:

limiting the *W* channels to an even number;

dividing the *W* channels into a first group and a second group in each of the links;

coupling each channel of the first group of one of the links to one channel of the second group of each of the links other than the one link; and

assigning no more than *W* channels to the transmission of data along any of the links, whereby the efficiency of the configuring is improved.

The invention also is useful in a star communication network comprising in combination:

a plurality of spoke nodes;

a hub node; and

links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry a plurality of W channels into the hub node and out of the hub node, the channels being divided into a first group and a second group where *W* is even, the hub node coupling each channel of the first group of one of the links to one channel of the second group of each of the links other than the one link.

The invention also is useful in a star communication network comprising a hub node and a plurality of spoke nodes and comprising links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry a plurality of *W* channels into the hub node and out of the hub node. In such an environment, a method of configuring the network may comprise the steps of:

assigning no more than W channels to the transmission of data along any of the links; and

coupling each channel of a first one of the links to no more than two channels of a second one of the links through the hub node, whereby the efficiency of the configuring is improved.

The invention also is useful in a star communication network comprising in combination:

a plurality of spoke nodes;

a hub node; and

links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry a plurality of W channels into the hub node and out of the hub node, the hub node coupling each channel of a first one of the links to no more than two channels of a second one of the links through the hub node.

The invention also is useful in a star communication network comprising a hub node and a plurality of spoke nodes and comprising links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry a plurality of no more than W channels into the hub node and out of the hub node. In such an environment, a method of configuring the network may comprise the steps of:

assigning no more than W channels to the transmission of data along any of the links; and

coupling each channel of a first one of the links to no more than a second channel of a second one of the links through the hub node, where the second channel is different from the first channel of the second one of the links.

The invention also is useful in a star communication network comprising in combination:

a plurality of spoke nodes;

a hub node; and

links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry a plurality of no more than W channels into the hub node and out of the hub node, the hub node coupling each channel of a first one of the links to no more than a second channel of a second one of the links through the hub node, where the second channel is different from the first channel of the second one of the links.

The invention also is useful in a method of proposing a star network comprising:

proposing a network comprising a hub node and a plurality of spoke nodes;

proposing links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry a plurality of W channels into the hub node and out of the hub node, the channels being divided into a first group and a second group where W is even; and

proposing that the hub node couples each channel of the first group of one of the links to one channel of the second group of each of the links other than the one link.

The invention also is useful in a method of proposing a star communication network comprising:

proposing a hub node and a plurality of spoke nodes;

proposing links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry no more than W channels into the hub node and out of the hub node; and

proposing that the hub node couples each channel of a first one of the links to no more than two channels of a second one of the links through the hub node.

The invention also is useful in a star network comprising a plurality of *N* nodes intercoupled by a plurality of links, with one of the nodes being the *hub* node *h* and the

other nodes being $\{x_1, \ldots, X_{N-1}\}$ *spoke nodes*, and being coupled to the hub node by one of the links comprising *W* channels, where *W* is even. In such an environment, a method of configuring the nodes may comprise:

(a) dividing channels into two sets, with each set comprising *W*/2 channels, where the first set has channels numbered $\{0,\ldots,W/2-1\}$ and the second set has channels numbered $\{W/2,\ldots,W-1\}$;

(b) configuring the hub node such that channel *i* on any one of the links may be coupled to channel *w(i)* on any of the links by a connection, where *w(i)* equals *i* + *W*/2;

(c) assigning channels to the connection which traverses at most two of the links, wherein paths $p_1,\ldots,p_m$ traverse exactly two of the links and paths $p_{m+1},\ldots,p_M$ traverse only one of the links, wherein the links are designated as links $e_1,e_2,\ldots,e_{N-1}$ such that for $i=1,\ldots,N-1, e_i$ is between nodes x_i and *h*;

(d) identifying a path incident to the end nodes of the path;

(e) directing paths$\{p_1,\ldots,p_m\}$ so that each path extends from one end node of the path to the other end node of the path, each spoke node comprising at most *W*/2 incident paths that are directed into the spoke node and at most *W*/2 incident paths that are directed out of the spoke node;

(f) identifying a free node that has at least one incident undirected path;

(g) directing the paths $\{p_1,\ldots,p_m\}$ by using the following procedure:

i. if each link has exactly *W* paths from the set $\{p_1,\ldots,p_M\}$ that traverse the link then let *R* = *M*; otherwise, construct additional paths $p_{M+1}, p_{M+2},\ldots p_R$ in the star network so that for each link, there are exactly *W* paths from the set $\{p_1,\ldots,p_R\}$ that traverse the link;

ii. considering all paths$\{p_1,\ldots,p_R\}$ undirected, and

iii. as long as there is a free node,

A. starting from a free node, x_i, and traversing an undirected incident path (from the set $\{p_1, \ldots, p_R\}$) to the other end node, and directing the path in the direction of the traversal,

B. starting from the other end node, traversing an undirected incident path (from the set$\{p_1, \ldots, p_R\}$) to the next end node, and directing the path in the direction of the traversal, and

C. keep traversing undirected paths (and directing the traversed paths) until x_i, is reached;

(h) creating a bipartite graph *G* which has two sets of vertices $\{u_1, \ldots, u_{N-1}\}$ and $\{v_1, \ldots, v_{N-1}\}$ and has edges $\{b_1, \ldots, b_m\}$ such that for $i = 1, \ldots, m$, b_i is between u_j and v_k if path p_i is directed so that it traverses link e_j and then e_k;

(i) assigning a number from the first set of channels $\{0, \ldots, W/2-1\}$ to the edges of graph *G* such that at any vertex in graph *G* has all of its incident edges assigned to a distinct number of the first set, and denoting the number assigned to each edge b_i by $q(b_i)$; and

(j) for $i = 1, \ldots, m$, assigning channels to p_i where

i. the channels are $q(b_i)$ from link e_j and $w(q(b_i))$ from link e_k where *j* and *k* are such that u_j and v_k are the end vertices of b_i, where $w(i) = i + W/2$, and

(k) for $i = 1, 2, \ldots, N-1$, assigned distinct channels to all paths from the set $\{p_{m+1}, \ldots, p_M\}$ that traverse the link e_i such that the channels are not already assigned to paths from $\{p_1, \ldots, p_m\}$.

The invention also is useful in a network comprising *N* nodes and *E* links $e_1, e_2, \ldots, e_E$, wherein each link between nodes comprises a multichannel multiplexed link, comprising *W* channels $\{0, 1, \ldots, W-1\}$, where *W* is even. In such an environment, a method of configuring the nodes in the network may comprise:

(a) grouping the channels into two sets, $\{0,\ldots,W/2-1\}$ and $\{W/2,\ldots,W-1\}$;

(b) at each node, for $i = 0, 1, \ldots, W/2-1$, coupling channel *i* on one link to channel *w(i)* on all the other links incident on that node, where $w(i) = i + W/2$;

(c) assigning channels to connections 1, 2, ..., *m* using paths $p_1,\ldots, p_m$, wherein each of the paths traverses at most two of the links, where no two connections traversing the same one of the links are assigned to the same channel on the one link;

(d) creating an equivalent star network with *E* + 1 nodes with the *E* nodes $e'_1, e'_2, \ldots e'_E$ corresponding to the edges in the original network and the remaining node *h* being the hub node; and

(e) creating an equivalent set of connections in the star network $p'_1, p'_2, \ldots p'_m$ such that:

i. if connection p_i uses link e_j in the original network then connection p'_i uses the link between nodes e'_j and *h* in the star network,

ii if connection p_i uses links e_j and e_k in the original network then connection p'_i uses the following two links in the star network: the link between nodes e'_j and *h* and the link between nodes e'_k and *h*,

iii assigning channels to the p'_i according to step (c) and assigning the same set of channels to p_i as to p'_i, and

iv assigning channels to the set of paths $p'_i,\ldots, p'_m$ such that for $i = 1, 2, \ldots, m$ if p'_i is assigned channel *c* on the link between nodes e'_j and *h* and is also assigned channel c' on the link between nodes *h* and e'_k in the star network then *c* and c′ are the channels assigned to path p_i for links e_j and e_k respectively.

CLAIM LISTING:

1-10. (Canceled)

11. (Currently Amended) In a star network ~~having~~ comprising a plurality of *N* nodes where N is an integer equal to or greater than three, the N nodes being ~~interconnected~~ intercoupled by a plurality of links, with one of the nodes being the hub node *h* and the other of the nodes being $\{x_1,\ldots,X_{N-1}\}$ spoke nodes ~~connected~~ coupled to the hub node by links each ~~having~~ comprising a plurality of *W* channels going into the hub node h and out of the hub node h, where W is even, a method of configuring the nodes comprising:

(a) dividing the channels into two sets, with each set ~~having~~ comprising W/2 channels, where the first set has channels numbered $\{0,\ldots,W/2-1\}$ and the second set has channels numbered $\{W/2,\ldots,W-1\}$; and

(b) configuring the hub node such that channel *i* on any one of the links may be ~~connected~~ coupled to channel *w(i)* on any of the links, where *w(i)* equals *i* + W/2 and where *i* is no greater than W.

12. (Canceled)

13. (Currently Amended) In a star network ~~having~~ comprising *N* nodes where N is an integer equal to or greater than three, with one of the nodes a hub node, wherein each of the other of the nodes is ~~connected~~ coupled to the hub node by a multichannel link ~~having~~ comprising *W* channels, where *W* is an even integer, a star network configured as follows:

the hub node configured such that channel *i* on any one of the links may be ~~connected~~ coupled to channel *w(i)* on any other of the links, where *w(i)* = (i + W/2) and where *i* is no greater than *W*.

14. (Currently Amended) In a network ~~consisting of~~ comprising *N* nodes and *E* links e_1, e_2, ...e_E, wherein *N* and *E* are any integer and wherein each link between nodes comprises ~~is~~ a multichannel multiplexed link, ~~consisting of~~ comprising *W* channels {0, 1, ..., W – 1}, where *W* is even, a method of configuring the nodes in the network comprising:

(a) grouping channels into two sets, $\{0,\ldots,W/2-1\}$ and $\{W/2,\ldots,W-1\}$; and

(b) at each node, for *i* = 0, 1, ..., W/2 – 1, ~~connecting~~ coupling channel *i* on one link to channel *w(i)* on all the other links incident on that node, where *w(i)* = *i* + W/2.

15. (Canceled)

16. (Currently Amended) A network ~~having~~ comprising *N* nodes and *E* links for ~~interconnecting~~ intercoupling the nodes where *N* and *E* are any integer, where each link ~~is~~ comprises a multichannel multiplexed link ~~having~~ comprising *W* channels, and where *W* is even, a network configured as follows:

each node, for *i* = 0, 1...., W/2 – 1, channel *i* on one incident link ~~connected~~ coupled to channel *w(i)* on all other incident links of each node, where *w(i)* = i + W/2.

17. (Currently Amended) In a star communication network comprising a hub node and a plurality of spoke nodes and comprising a plurality of links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry a plurality of W channels into the hub node and out of the hub node, a method of configuring the network comprising the steps of:

limiting the *W* channels to an even number;

dividing the *W* channels into a first group and a second group in each of the links;

~~connecting~~ coupling each channel of the first group of one of the links to one channel of the second group of each of the links other than the one link; and

assigning no more than *W* channels to the transmission of data along any of the links, whereby the efficiency of the configuring is improved.

18. (Previously Presented) A method, as claimed in claim 17, and further comprising the step of assigning routes to the channels which traverse at most two of the links.

19. (Currently Amended) A method, as claimed in claim 17, wherein the step of ~~connecting~~ coupling comprises the step of ~~connecting~~ coupling each channel $i = 0,1,\ldots, W/2 - 1$ of a first one of the links through the hub node to channel $w(i)$ on each of the links other than the first link where $w(i) = i + W/2$.

20. (Currently Amended) A star communication network comprising in combination:

a plurality of spoke nodes;

a hub node; and

links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry a plurality of W channels into the hub node and out of the hub node, the channels being divided into a first group and a second group where *W* is even, the hub node ~~connecting~~ coupling each channel of the first group of one of the links to one channel of the second group of each of the links other than the one link.

21. (Previously Presented) A network, as claimed in claim 20, wherein each link comprises no more than *W* channels.

22. (Previously Presented) A network, as claimed in claim 20, comprising routes arranged to carry the W channels, wherein the routes traverse at most two of the links.

23. (Currently Amended) A network, as claimed in claim 20, wherein each channel $i = 0,1,\ldots, W/2 - 1$ of the one link is ~~connected~~ coupled through the hub node to channel $w(i)$ on all of the links other than the one link where $w(i) = i + W/2$.

24. (Currently Amended) In a star communication network comprising a hub node and a plurality of spoke nodes and comprising links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry a plurality of *W* channels into the hub node and out of the hub node, a method of configuring the network comprising the steps of:

assigning no more than W channels to the transmission of data along any of the links; and

~~connecting~~ coupling each channel of a first one of the links to no more than two channels of a second one of the links through the hub node, whereby the efficiency of the configuring is improved.

25. (Currently Amended) A star communication network comprising in combination:

a plurality of spoke nodes;

a hub node; and

links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry a plurality of W channels into the hub node and out of the hub node, the hub node ~~connecting~~ coupling each channel of a first one of the links to no more than two channels of a second one of the links through the hub node.

26. (Currently Amended) In a star communication network comprising a hub node and a plurality of spoke nodes and comprising links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry a plurality of no more than W channels into the hub node and out of the hub node, a method of configuring the network comprising the steps of:

assigning no more than W channels to the transmission of data along any of the links; and

~~connecting~~ coupling each channel of a first one of the links to no more than a second channel of a second one of the links through the hub node, where the second channel is different from the first channel of the second one of the links.

27. (Currently Amended) A star communication network comprising in combination:

a plurality of spoke nodes;

a hub node; and

links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry a plurality of no more than W channels into the hub node and out of the hub node, the hub node ~~connecting~~ coupling each channel of a first one of the links to no more than a second channel of a second one of the links through the hub

node, where the second channel is different from the first channel of the second one of the links.

28. (Currently Amended) A method of proposing a star network comprising:

proposing a network comprising a hub node and a plurality of spoke nodes;

proposing links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry a plurality of W channels into the hub node and out of the hub node, the channels being divided into a first group and a second group where W is even; and

proposing that the hub node ~~connects~~ couples each channel of the first group of one of the links to one channel of the second group of each of the links other than the one link.

29. (Currently Amended) A method of proposing a star communication network comprising:

proposing a hub node and a plurality of spoke nodes;

proposing links coupled between the hub node and the plurality of spoke nodes, each link being arranged to carry no more than W channels into the hub node and out of the hub node; and

proposing that the hub node ~~connects~~ couples each channel of a first one of the links to no more than two channels of a second one of the links through the hub node.

30. (Currently Amended) In a star network ~~having~~ comprising a plurality of *N* nodes ~~interconnected~~ intercoupled by a plurality of links, with one of the nodes being the *hub* node *h* and the other nodes being $\{x_1, \ldots, X_{N-1}\}$ *spoke nodes*, and being

~~connected~~ coupled to the hub node by one of the links ~~having~~ comprising *W* channels, where *W* is even, a method of configuring the nodes comprising:

(a) dividing channels into two sets, with each set ~~having~~ comprising *W/2* channels, where the first set has channels numbered $\{0,\ldots,W/2-1\}$ and the second set has channels numbered $\{W/2,\ldots,W-1\}$;

(b) configuring the hub node such that channel *i* on any one of the links may be ~~connected~~ coupled to channel *w(i)* on any of the links by a connection, where *w(i)* equals *i* + *W/2*;

(c) assigning channels to the connection which traverses at most two of the links, wherein paths $p_1,\ldots,p_m$ traverse exactly two of the links and paths $p_{m+1},\ldots,p_M$ traverse only one of the links, wherein the links are designated as links $e_1,e_2,\ldots,e_{N-1}$ such that for $i=1,\ldots,N-1,e_i$ is between nodes x_i and *h*;

(d) identifying a path incident to the end nodes of the path;

(e) directing paths$\{p_1,\ldots,p_m\}$ so that each path extends from one end node of the path to the other end node of the path, each spoke node ~~having~~ comprising at most *W/2* incident paths that are directed into the spoke node and at most *W/2* incident paths that are directed out of the spoke node;

(f) identifying a free node that has at least one incident undirected path;

(g) directing the paths $\{p_1,\ldots,p_m\}$ by using the following procedure:

i. if each link has exactly *W* paths from the set $\{p_1,\ldots,p_M\}$ that traverse the link then let *R* = *M*; otherwise, construct additional paths $p_{M+1}, p_{M+2},\ldots p_R$ in the star network so that for each link, there are exactly *W* paths from the set $\{p_1,\ldots,p_R\}$ that traverse the link;

ii. considering all paths$\{p_1,\ldots,p_R\}$ undirected, and

iii. as long as there is a free node,

A. starting from a free node, x_i, and traversing an undirected incident path (from the set $\{p_1, \ldots, p_R\}$) to the other end node, and directing the path in the direction of the traversal,

B. starting from the other end node, traversing an undirected incident path (from the set$\{p_1, \ldots, p_R\}$) to the next end node, and directing the path in the direction of the traversal, and

C. keep traversing undirected paths (and directing the traversed paths) until x_i, is reached;

(h) creating a bipartite graph *G* which has two sets of vertices $\{u_1, \ldots, u_{N-1}\}$ and $\{v_1, \ldots, v_{N-1}\}$ and has edges $\{b_1, \ldots, b_m\}$ such that for $i = 1, \ldots, m_1$ b_i is between u_j and v_k if path p_i is directed so that it traverses link e_j and then e_k;

(i) assigning a number from the first set of channels $\{0, \ldots, W/2-1\}$ to the edges of graph *G* such that at any vertex in graph *G* has all of its incident edges assigned to a distinct number of the first set, and denoting the number assigned to each edge b_i by $q(b_i)$; and

(j) for $i = 1, \ldots, m$, assigning channels to p_i where

i. the channels are $q(b_i)$ from link e_j and $w(q(b_i))$ from link e_k where *j* and *k* are such that u_j and v_k are the end vertices of b_i, where $w(i) = i + W/2$, and

(k) for $i = 1, 2, \ldots, N-1$, assigned distinct channels to all paths from the set $\{p_{m+1}, \ldots, p_M\}$ that traverse the link e_i such that the channels are not already assigned to paths from $\{p_1, \ldots, p_m\}$.

31. (Currently Amended) In a network ~~consisting of~~ comprising *N* nodes and *E* links $e_1, e_2, \ldots, e_E$, wherein each link between nodes ~~is~~ comprises a multichannel multiplexed link, ~~consisting of~~ comprising *W* channels $\{0, 1, \ldots, W-1\}$, where *W* is even, a method of configuring the nodes in the network comprising:

(a) grouping the channels into two sets, $\{0, \ldots, W/2-1\}$ and $\{W/2, \ldots, W-1\}$;

(b) at each node, for $i = 0, 1, \ldots, W/2-1$, ~~connecting~~ coupling channel *i* on one link to channel *w(i)* on all the other links incident on that node, where $w(i) = i + W/2$;

(c) assigning channels to connections 1, 2, ..., *m* using paths $p_1, \ldots, p_m$, wherein each of the paths traverses at most two of the links, where no two connections traversing the same one of the links are assigned to the same channel on the one link;

(d) creating an equivalent star network with *E* + 1 nodes with the *E* nodes $e'_1, e'_2, \ldots e'_E$ corresponding to the edges in the original network and the remaining node *h* being the hub node; and

(e) creating an equivalent set of connections in the star network $p'_1, p'_2, \ldots p'_m$ such that:

i. if connection p_i uses link e_j in the original network then connection p'_i uses the link between nodes e'_j and *h* in the star network,

ii if connection p_i uses links e_j and e_k in the original network then connection p'_i uses the following two links in the star network: the link between nodes e'_j and *h* and the link between nodes e'_k and *h*,

iii assigning channels to the p'_i according to step (c) and assigning the same set of channels to p_i as to p'_i, and

iv assigning channels to the set of paths $p'_i, \ldots, p'_m$ such that for $i = 1, 2, \ldots, m$ if p'_i is assigned channel *c* on the link between nodes e'_j and *h* and is also assigned channel c' on the link between nodes *h* and e'_k in the star network then *c* and c' are the channels assigned to path p_i for links e_j and e_k respectively.